cells, the author maintains, is proportionate to the amount of rays absorbed and that different nuclei and protoplasm absorb different amounts. The quantity absorbed is dependent upon intracellular physicochemical or chemical conditions which the writer feels would furnish an interesting field for study.

HYGIENE AND PUBLIC HEALTH

UNDER THE CHARGE OF
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Notes on Typhus.—WOLBACH, TODD and PALFREY (*Internat. Jour. Public Health*, September, 1920, No. 2, i) were members of the Typhus Research Commission of the League of Red Cross Societies to Poland. They did their work last winter in Warsaw. These investigators planned a series of experiments with the purpose of determining the nature and specificity of microörganisms acquired by lice fed on typhus fever patients. Thirteen unsuccessful attempts were made to cultivate the organism described by Plotz. They find that the distinctive pathology of typhus fever is microscopic. The disease is characterized by lesions in the smaller bloodvessels. The vessels of the skin and the smaller vessels of the central nervous system are most often affected. The earliest lesion noted is a reaction of the endothelium, which proliferates, followed by degeneration and necrosis. In larger vessels these processes lead to a formation of thrombi; in smaller vessels there is sometimes a destruction of continuity followed by an extravasation of blood. This occurs most often in the capillaries of the skin and brain. Occluding thrombi of the larger arteries and veins of the skin frequently occur, but mural thrombi are constant. These changes are so characteristic that a diagnosis of typhus fever can be made from the skin excised during life; in only one other disease, Rocky Mountain spotted fever, do similar lesions occur. In the endothelial cells of vessels presenting lesions a microörganism has been found. This is similar in appearance to that described in Rocky Mountain spotted fever (Wolbach: *Jour. Med. Res.*, November, 1919, p. 197) and in the typhus fever of Mexico (Wolbach and Todd: *Jour. Inf. Dis.*, July, 1915, p. 1). The organism has been seen in 13 instances in skin excised from patients during life and in 22 instances in tissues obtained at autopsy. The most easily demonstrable form of the organism occurs in clumps; the individual organisms are pairs of slightly elongated bodies with tapering ends. They are surrounded by an unstained area. The length of a paired organism is from 1 to 1.5 microns. Isolated pairs and groups of several pairs are found with considerable frequency in swollen endothelial cells both in relation to thrombi and remote from lesions; they are found both in tissues taken during life and in material obtained shortly after death. A second form of the organism, occurring much less frequently, is a minute paired granule which fills endothelial cells while they are still *in situ*. In skin excised during life and in tissues obtained at autopsy, peculiar swollen and vacuolated endothelial cells are seen; in the authors' experience, they occur only in typhus. In them are numerous granules, which often completely fill the cell. The granules are very small; they are at the limit of visibility. They are being studied as a possible third form of the parasite. All forms of the organism stain blue. The larger paired forms are deeply colored; the other forms retain the stain less densely. Typhus was transmitted to guinea-pigs by the inoculation of infected lice. The disease runs the recognized course in infected animals. Characteristic lesions occur in the brain. The testes and epididymis often show an occasional vessel with lesions of the intima, thrombi and perivascular reaction quite similar to those observed in patients. The larger forms of the organism as seen in man have already been found in the lesions of cerebral vessels in the guinea-pig. Great pains were first taken to be sure that the stock lice used in the experiments were uninfected. It was found that the organisms were acquired by these lice when fed upon cases of typhus fever during the first ten days of the disease. The organisms are consistent in their characteristics with those described by da Rocha Lima as Rickettsia prowazeki (Da Rocha Lima: *Deutsch. med. Wchnschr*, July 3, 1919, p. 732). They are exceedingly pleomorphic. They vary in form from a minute, paired body to a bacilliform organism measuring several microns in length; both the minute and the bacillary forms occur in chains; the chains of bacilliform organisms often measure more than 15 microns in length. The organisms may be present in infected lice in extraordinary numbers. Every epithelial cell lining a louse's gut may be enormously distended by myriads of organisms, and through the bursting of the cells many organisms may be set free into the lumen of the gut. The distended cells of a heavily infected louse can be easily seen with a low magnification (objective 16 mm.) or even unstained with a dissecting microscope. All forms of the organism may be present in the distended cells of a heavily infected midgut; but the small forms occur most frequently and, as a rule, occur in cells that are most distended. The authors have formed the impression that the bacillary phase occurs early in the infection of a cell and that the minute form of the organism is characteristic of an advanced cell infection. As a rule, all organisms, whether intracellular or free in the lumen of the alimentary tract, stain blue; occasionally, organisms free in the gut are colored red, possibly because of variations in technic. The authors state in conclusion that in lice fed upon typhus patients under conditions determined to be favorable a peculiar, pleomorphic microörganism is constantly present. This microorganism is that named by da Rocha Lima Rickettsia prowazeki. In the vascular lesions of man and experimental animals infected with typhus a minute microörganism has been demonstrated. In morphology and staining reactions it is consistent with Rickettsia prowazeki in at least two of the forms in which it is seen constantly in lice.

Influence of Smallpox and Vaccination on Pulmonary Tuberculosis.—Howk and Lawson (*Am. Rev. Tuberc.*, September, 1920, No. 7, iv, 490) record an epidemic of smallpox occurring in the Metropolitan Life Insurance Company Sanatorium in the autumn of 1914. Time was purposely allowed to intervene between the epidemic and the writing of a formal record of it in order that the observations might show, not alone the immediate effects, but some of the remote influences of smallpox on pulmonary tuberculosis as well. There have been few similar experiences reported, nor is more than brief mention made in any of the writings on exanthematous diseases of the possible or probable effect that smallpox may have on clinical tuberculosis, although the literature is quite replete with reports of certain other concurrent complications of pulmonary tuberculosis. There were 7 cases of pulmonary tuberculosis which contracted smallpox, all of which recovered. In 1 case there was a moderately severe bronchitis following the onset of smallpox. There was no development of pneumonia in any case. The smallpox was of a mild form in 6 cases, severe in one, and its course was apparently unaffected by the presence of tuberculosis. The one outstanding feature of the tuberculosis following smallpox was the marked diminution of expectoration in two advanced, active cases. The effect was more striking than anything witnessed in tuberculosis, except the reduction following artificial pneumothorax. In 1 case there has never been any return of sputum or bacilli, although the patient had extensive basal lesions. In the other the sputum and bacilli were absent for four months. The authors conclude that smallpox, occurring in patients with pulmonary tuberculosis, runs a course not noticeably different from that encountered in well people. The symptomatology, appearances of exanthem, and duration of the smallpox are not influenced by the presence of tuberculosis. In early, inactive cases of tuberculosis with favorable prognosis there is no apparent interruption of recovery when complicated by smallpox. In 1 active advanced case there was a disappearance of sputum and bacilli after smallpox, lasting for four months. In one very very active and advanced case there was a permanent disappearance of sputum and bacilli immediately after the smallpox. The disease was progressive up to the time of smallpox and retrogressive thereafter. The 7 recovered from smallpox and 6 are alive and well at present. The presence of tuberculosis does not affect the normal course of vaccinia. Tuberculosis in any stage or any degree of activity was not affected by vaccination, either favorably or unfavorably.

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